



HL7810, HL7812, and HL7845

Customer Release Notes



SIERRA
WIRELESS®

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Revision History

Revision number	Release date	Changes
1.0	October 2022	Creation for Release 3.0 (Old naming HL78XX.5.4.10.0)
2.0	January 2023	Add Release 3.1 (Old naming HL78XX.5.4.12.1)
3.0	September 2023	Add Release 3.3 (Old naming HL78XX.5.4.12.3)

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>> 1: Introduction

1.1 Document Scope

This document describes HL7810, HL7812, and HL7845 firmware release changes and known issues in external customer releases.

1.2 Document Audience

These release notes may be distributed to all direct and indirect customers.

>> 2: Compatibility

2.1 Software Compatibility

S/W Tools Name	Version
ImageBurnTool	V 1.0.0.0

>> 3: Released Files and Download Processes

Firmware may be updated on existing units using the following methods:

- Full image upgrade over UART or USB
- Differential upgrade locally over AT command port (UART or USB)
- Remotely via AVMS, carrier LWM2M or other 3rd party server where applicable (for Delta only).

Detailed procedures are described in reference HL781x - FW Update Methods Application Note. Some limitations may apply.

>> 4: Release 3.3 (Previously 5.4.12.3)

4.1 Release Description

Table 4-1: Package Release Information

	Services (ATI9)
Firmware Identification	HL7810.5.4.12.2 HL7812.5.4.12.2 HL7845.5.4.12.2
Components	Chipset baseline: RK0302002224731001 Legato RTOS: 23.01.0.FreeRTOS.rc2 atSwi: 23.01.0.FreeRTOS.rc2 UBOOT: 01.03 Apps: RKAPP_03_02_00_22_24651_001__38231c6d829dbf9c71390d591eff7fc36cfd187b M1 MAC(HL7810,7845): ALT1250_03_02_00_22_24731_FW M1 MAC(HL7812): ALT1250_03_02_00_22_24731_2G
Date of Generation	2023/03/31
IMEI SV	12
TS 25 PLMN List	07-Nov-2022 (ALT1250-5096)
Supported HW	HL7810, HL7812, HL7845

4.1.1 Software Change Description

This section describes all corrections or improvements integrated in Release 3.3

Table 4-2: New Features and Improvements

ID	Title	Description	Impacted Domain
ALT1250-5058	Verizon Context 3 is deleted after KUDPCLOSE and recreated. It can take up to 6 minutes for the context to be re-created.	KUDPCLOSE and KTCPCLOSE will deactivate the PDN used by the socket if there are no other sockets using the context. The solution is updating KUDPCLOSE and KTCPCLOSE to only deactivate PDN if the PDN was inactive at the time of socket creation, leave it activated otherwise.	Network
HYB-665	RI not triggered when moving from PSM to eDRX	Customer will close network before eDRX configuration and closing network will close udp socket, so here add udp socket auto creation while network is back.	Network
ALT1250-5096	TS.25 List is not updated and is now obsolete for GCF certification	Provide a way to update the list without changing the FW	Standards and Carrier compliance

Table 4-3: Bugs Resolved

ID	Title	Description	Impacted Domain
ALT1250-4963	[HL78xx] [KTCPCFG] [KUDPCFG] Restore session on boot works incorrect	There is a race condition that MRC reports NetworkRegEventId event before service is ready. Adding a delay reporting to service and KUDPCFG restore on boot to resolve it.	Network
HYB-714	Modem crash observed on Rev.13 Modem FW test build	The rare possibility causing the modem boot-up failure, this issue can be observed by a long-time loop test.	System
HYB-713	Modem gives ERROR response for AT+KUDPRCV cmd on REV.13 build	When modem is woken up by host, UART will generate non-ASCII garbage characters in buffer top. The solution is to add a function to skip garbage characters before "AT" in at_client.	AtClient
HYB-699	RI is halted permanently after receiving KUDP_DATA buffer by host and do not trigger AT+KUDPRCV	RI is halted permanently if module provides KUDP_DATA URC and host didn't run AT+KUDPRCV accordingly. So we add data_mode=2 to set a timeout to drop KUDP_DATA URC if it is not needed.	Network
HYB-706	KUDPCFG? gives unexpected response even if UDP session is already created	There is a race condition that MRC reports NetworkRegEventId event before AtSwi is ready. Added a delay reporting to AtSwi and KUDPCFG restore on boot to resolve it.	Network
ALT1250-5056	Module becomes unresponsive when re-opening DLC	Trigger CMUX/Open DLC/Close DLC/Re-Open DLC cannot send AT commands.	CMUX

Table 4-3: Bugs Resolved (Continued)

ID	Title	Description	Impacted Domain
ALT1250-4964	AT+KGPIOCFG missing some pins	Typo of weshdown code transferring results in this issue. Correct the typo to fix it.	GPIO
HYB-692	UDP URC is coming after delay of 300-400ms after RI interrupt.	The RI indication signal is slower than UDP URC. Customer requests RI indication first then URC, so removing Legato event notification and directly call RI function to let RI first and URC later.	KRIC
ALT1250-4832	+KMON=1 is not persistent	"AT+KMON=1 being not persistent" leads to inability to debug crash issues because the crash log is never fully returned.	Debug
HYB-659	HL7810 unable to process AT commands immediately after CTS Assert once after PowerOff followed by PowerOn		System
HYB-690	HL7810 - Modem appending extra <CR><LF> for CONNECT when AT+KUDP_RCV cmd is triggered as part of UDP Rx	Introduce extra <CR><LF> at specific version of HYB to work around the MCU and modem AT bridge issue. Align with EURY, removing extra <CR><LF> due to MCU is obsolete.	AT proxy
HYB-696	Add GPIO2 asserting trigger as RI for LwM2M packet	Add support RI indication for these LWM2M URCs: +DMEVENT, +DMAPPCMDIND and +DMFOTAIND. A new RI mask will be added to +KRIC in Legato. In FW side, signal will be sent to Legato to request RI indication for these LWM2M URCs: +DMEVENT, +DMAPPCMDIND and +DMFOTAIND.	Modem RI
ALT1250-4693	SIMAPPINT TC 8.1.2 - UE fails to connect to admin PDN	Type 4 LTE CAT M1 IMS-LESS Force Polling, UE fails to connect to admin PDN	Certification
ALT1250-4311	Returned Altair FW version instead of SWI FW version	Customer saw "ALT1250xxx" issue in the field when they performed FOTA update for XMODEM from FW4.6.6.0 to FW4.6.9.2.	System
ALT1250-5009	TC 4.05 Device Type returns Cellular IoT Chipset	VZW requires that the default Device Type of LwM2M should be "IoT Module".	Certification
ALT1250-5019	TC 4.06 HW version is shown as A.B	TC 4.06 HW version is shown as A.B. HW version information should be improved to show 1.0.	Certification

Table 4-3: Bugs Resolved (Continued)

ID	Title	Description	Impacted Domain
ALT1250-5032, HYB-686	With Cell_OFF and module configured to output NMEA frames on UART1, modules reset after 6-7 hours	As the AT port is switched to data mode for NMEA sentences stream, every +GNSSEV URC sent to this port will be stored in a double linked list. The stored URCs are increased and drain our very limited RAM memory. Then, a crash happens when new memory allocation failed. The solution is disable +GNSSEV URC while NMEA sentences are streaming.	GNSS
HYB-682	GNSS cold start is not applied when trying to activate it with AT+GNSSSTART	AT+GNSSSTART was designed to start GNSS by command at+ignssact=1, change the design to start GNSS cold mode by using command AT+IGNSSACT=1,1	GNSS

4.2 Known Issues

The following issues may be observed in the Release 3.3.

ID	Title	Description	Impacted Domain
ALT1250-5103	Error response on AT+KTCPSTART	Module does not respond for KTCPSTART if secure connection is unsuccessful.	TCP
ALT1250-5089	AT character error when the module is in USB mode	In USB mode, the module does not respond with the final character of AT command. Need to enter again to execute the command.	USB
ALT1250-5085	Module reboots in eDRX mode to different cell coverage	[HL78xx][VZW][eDRX] The module unexpectedly reboots after re-attaching Verizon network (the cell is changed). 10% reproduced rate.	eDRX
HYB-783, ALT1250-5177	GNSS cold start fails on AT+GNSSSTART	<ul style="list-style-type: none">• With Cell_OFF and module configured to output NMEA frames on UART1 or UART0, modules reset after 24 hours.• +GNSSEV does not display when starting and stopping GNSS in USB port.	GNSS
ALT1250-4877	WDSI response incorrect during FOTA stress test	Module does not display "+WDSI: 14" after "+WDSI: 10" and installs package about 16 minutes later during FOTA stress test.	FOTA

>> 5: Release 3.1 (Previously 5.4.12.1)

5.1 Release Identification

Table 5-1: Package Release Information

	Services (ATI9)
Firmware Identification	HL7810.5.4.12.1 HL7812.5.4.12.1 HL7845.5.4.12.1
Components	Chipset baseline: RK0302000024271001 Legato RTOS: 22.10.0.FreeRTOS.w43 atSwi: 22.10.0.FreeRTOS.w43 UBOOT: 01.03 Apps: RKAPP_03_02_00_00_24141_003__8c58020c3faa979ee7380bc905d0267fc2aed66e M1 MAC(HL7810,7845): ALT1250_03_02_00_00_24271_FW M1 MAC(HL7812): ALT1250_03_02_00_00_24271_2G
Date of Generation	2022/11/02
IMEI SV	12
TS 25 PLMN List	7 June 2021
Supported HW	HL7810, HL7812, HL7845

5.1.1 Software Change Description

This section describes all corrections or improvements integrated in 5.4.12.1.

Table 5-2: New Features and Improvements

ID	Title	Description	Impacted Domain
Network			
HYB-330	IPv6 Address	IPv6: add ability to fix the lowest 64 bits of the IPv6 address, please see AT command guide for details of AT+KIPVSIXI.	
HYB-102	RF	Added antenna tuner support on HL7845	
Standards and Carrier Compliance			
HYB-348	Orange Approval - HL7812	Initial approval of HL7812 at Orange	

Table 5-3: Bugs Resolved

ID	Title	Description	Impacted Domain
ALT1250-4721 ALT1250-4726	CMUX URC Behavior	Issues: <ul style="list-style-type: none"> The URC configuration on the MUX channels are applied globally. Change CMUX RTS signal are always in hardware flow control. 	
HYB-261 HYB-127 HYB-603	NVBU / Auto restore	Issues: <ul style="list-style-type: none"> Module does not auto restore when the reboot counters reach its limit Module takes 5 minutes to restore Factory fresh units crash/NV restore when changing KCARRIERCFG 	
HYB-573 ALT1250-4744 ALT1250-4720 ALT1250-4615 ALT1250-4561 ALT1250-4265	Incorrect Ring Indicator behavior	Issues: <ul style="list-style-type: none"> RI Pulse on CGREG and CREG State change CGREG and CREG always share the same status PPP for RI, the duration setting is incorrect PPP for RI, the duration should be configurable PPP for RI, did not handle the send data package Module returns URC +CREG after attaching or detaching from the network although disable network registration is an unsolicited result code +CREG 	

Table 5-3: Bugs Resolved (Continued)

ID	Title	Description	Impacted Domain
ALT1250-4907 ALT1250-4585 ALT1250-4573	TCP / UDP	Issues: <ul style="list-style-type: none"> The module crashes when sending different combinations of dashes, plus and text to UDP server Module can't delete a TCP session when starting TLS over TCP server with server authenticate. Module crashes when starting TLS over TCP server using server authentication. 	
ALT1250-4613 ALT1250-4772	KSRAT	Module is stuck with +KSRAT=2 when using the T-Mobile network.	
HYB-606	PINGCMD	PINGCMD causing a crash when issued from CLI/DEBUG port	
HYB-605	AUX	AUX command always say ERROR instead of OK even though AUX is successfully captured .	
ALT1250-4594 ALT1250-4682	AVMS related	Issues: <ul style="list-style-type: none"> During bootstrap, unsolicited message responded incorrectly, so module could not receive the OTA message [AVMS][WDSS]-Module crashes when send AT+WDSS=1,0 before the URC +WDSI: 23,1 	
Low Power Mode			
ALT1250-4459	[LPM] Module cannot go to hibernation with APN configured	Configure APN for PDP context 1 and reset module. Make sure the module is attached to network, then configure eDRX or PSM. Configure module to go to hibernate mode using command AT+KSLEEP=1.	
ALT1250-4609	[PSM] Module crashes when entering into hibernate mode with embedded SIM after some period T3412	Module crashes when entering to hibernate mode with embedded SIM after some period T3412.	
HYB-578	High current consumption with DRX=320ms	High current consumption in hibernation mode with DRX=320ms	

5.2 Known Issues

The following issues may be observed in the Release 3.1.

ID	Title	Description	Impacted Domain
HYB-713, HYB-706, HYB-699	Error response on AT+KUDPRCV	<ul style="list-style-type: none"> Sometimes Modem gives ERROR response for AT+KUDPRCV cmd. Sometimes KUDPCFG? gives unexpected response even if UDP session is already created. RI getting halted permanently after receiving KUDP_DATA buffer by host and does not trigger AT+KUDPRCV. 	UDP
ALT1250-4963	Error response on AT+KTCPCFG	[HL78xx] [KTCPCFG] [KUDPCFG] Restore session on boot works incorrectly.	TCP
ALT1250-5085	Module reboots in eDRX mode to different cell coverage	[HL78xx][VZW][eDRX] The module unexpectedly reboots after re-attaching Verizon network (the cell is changed). 10% reproduced rate.	eDRX
HYB-682	GNSS cold start fail on AT+GNSSSTAR	GNSS COLD start is not applied when trying to activate it with AT+GNSSSTART	GNSS
HYB-659	AT command fail in power sequency	HL7810 unable to process AT commands immediately after CTS Assert once after PowerOff followed by PowerOn.	System
HYB-665, HYB-692	Ring Indicator fails when moving from PSM to eDRX	<ul style="list-style-type: none"> RI is not triggered when moving from PSM to eDRX. UDP URC is coming after a delay of 300-400ms after RI interrupt. 	Ring Indicator
ALT1250-4964	Error response on AT+KGPIOCFG	AT+KGPIOCFG missing some pins setting.	GPIO
ALT1250-4832	Crash log not return	"AT+KMON=1 being not persistent" leads to inability to debug crash issues because the crash log is never fully returned.	Debug
ALT1250-4980	KHTTPHEADER format not correct	[HL78xx] [KHTTPHEADER] Module lost "-" in AT+KHTTPHEADER sending	HTTP
ALT1250-4877	WDSI response incorrect during FOTA stress test	Module does not display "+WDSI: 14" after "+WDSI: 10" and installs package about 16 minutes later during FOTA stress test.	FOTA

>> 6: Release 3.0 (Previously 5.4.10.0)

6.1 Release Identification

Table 6-1: Package Release Information

	Services (ATI9)
Firmware Identification	HL7810.5.4.10.0 HL7812.5.4.10.0 HL7845.5.4.10.0
Components	Chipset baseline: RK0302000022111001 Legato RTOS: 22.04.0.FreeRTOS.w19 atSwi: 22.04.0.FreeRTOS.w19 UBOOT: 01.03 Apps: RKAPP_03_02_00_00_22061_001__d21d59a7ccfd13226f6533f3bf8647cb216120a8 M1 MAC(HL7810,7845): ALT1250_03_02_00_00_22111_FW M1 MAC(HL7812): ALT1250_03_02_00_00_22111_2G
Date of Generation	2022/05/30
IMEI SV	11
TS 25 PLMN List	7 June 2021
Supported HW	HL7810, HL7812, HL7845

6.1.1 Software Change Description

This section describes all corrections or improvements integrated in Release 3.0.

Table 6-2: New Features and Improvements

ID	Title	Description	Impacted Domain
Security			
HYB-374	Enable Secure Boot for HL7810/12/45	Required to enable Secure boot for new products HL7810, HL7812 and HL7845.	
HYB-379	NIDD	Add support for NIDD (Non-IP Data Delivery)	
HYB-244	GCF on HL781x	Initial GCF Approval	
HYB-12	PTCRB on HL781x	Initial PTCRB Approval	

Table 6-3: Bugs Resolved

ID	Title	Description	Impacted Domain
HYB-116	When config KCARRIERCFG=1, PDN configuration is incorrect	When config KCARRIERCFG=1, CID 3 and 4 are missing and could not delete CID 6 and 7 also could not add CID 3 and 4, however we can delete/add for CID 1.	
ALT1250-4559	[HL7812] CMUX HW Flow control not working	The HL7812 does not use HW-Flow control when in Multiplex Mode (GSM0710). The modem does respect the RTS set by the MCU, but it doesn't set its CTS anymore.	
HYB-273	[TCP MO] NO CARRIER during KTCPSND	During TCP MO data session, NO CARRIER is returned after AT+KTCPSND command. However, we do receive a KTCP_ACK indication showing that the data was received. In the FWATE logs, it shows that *more* data was received at the NW that what the UE sent	
HYB-519	Module fails to connect to Bootstrap server with IPV4V6	With a device properly registered to AirVantage, after device boots up, running at+wdss=1,1 will cause the device to fail to connect to Bootstrap server. This failure happens when at+cgdcont uses "IPV4V6" for the second parameter, the failure doesn't happen when using "IP" only.	
HYB-528	Module crash when close a CMUX port	This crash was observed on the latest master build. Steps to reproduce the crash: <ol style="list-style-type: none"> 1. Connect HL78 AT UART AT port to Windows 2. Open MuxConfTool on Windows and open 4 CMUX ports from the AT port. 3. Open one of the generated CMUX ports by PuTTY, type some commands such as "ati" make sure it responds. 4. Close PuTTY. After doing step 4, a crash happened and the CLI log showed	
ALT1250-4399	[FTP] Failed to create FTP connection	Failed to create FTP connection.	
HYB-263	[PSM] Module not entering DH0 state	Issues: <ul style="list-style-type: none"> • Module was unable to enter the PSM state during FWATE PSM test cases • Module waking up every ~5sec 	
HYB-262	[FWATE][eDRX] Frequent wake ups during eDRX	Issue: <ul style="list-style-type: none"> • Module is waking up during the eDRX cycle, adding to current consumption 	

Table 6-3: Bugs Resolved (Continued)

ID	Title	Description	Impacted Domain
ALT1250-3831	[RK3.0] Sleep mode failure with DTR wakeup enabled	DTR wakeup is broken on the RK3.0 branch. With KSLEEP=0,x,x, the module does not enter hibernate mode when all wakeup sources are removed. The CLI and AT ports are inactive after setting DTR off, but the current consumption goes up and never falls to the expected level. The following scope capture shows the increase in current consumption when the DTR wakeup source is removed.	
HYB-464	Optimize KNTPCFG for low power modes	Now that the SNTP service on the HL78 is configurable (HYB-298), we need to make sure that it is optimized (or that we can provide customer guidance) for use in conjunction with low power modes. Having the SNTP service running can add unexpected wakeups and in the worst case prevent entering low power modes.	
HYB-458	Device does not perform a graceful detach - issue uncovered by EURY-4378	When the MAC layer disables the SIM due to communication failure during hibernate wakeup, the device is not detaching from the NW. MAC FW sends a %SIMD URC that the connection manager on the MAP should receive and initiate detach from the NW. This is not happening, and it seems the %SIMD URC is never received by the MAP. On a subsequent wakeup, device detects no SIM but finds it is still attached to NW and then modem FW performs a local detach. Later, after device misses TAU it is implicitly detached from the NW. This might due to stateless hibernation and the MAP is either never woken up properly to receive URC, or this URC is sent too early (although we have fixed all other known instances of this problem). If this is true, the odds are very low that this will be fixed at 4.x FW.	
ALT1250-4463	[AVMS][FOTA][HL7845] Failed to upgrade FW with the FOTA job on AVMS	The module HL7845 cannot upgrade FW with the FOTA job on AVMS. <i>Note: The issue does not happen with HL7810.</i>	AVMS
ALT1250-4635	Include AISE version in package version failed in Jenkins job	The FOTA download will fail, and the app firmware information of the module on the AVMS will not be updated successfully after the synchronization procedure is successful.	AVMS

Table 6-3: Bugs Resolved (Continued)

ID	Title	Description	Impacted Domain
ALT1250-4539	[AVMS][FOTA][HL7845] Failed to upgrade FW with the FOTA job on AVMS	The module HL7845 cannot upgrade FW with the FOTA job on AVMS <i>Note: The issue does not happen with HL7810</i>	AVMS
ALT1250-4090	NVBackup	Issues: <ul style="list-style-type: none">AT+NVCU automatic mode: The module takes about 5 minutes to complete, during this time AT and CLI port is frozen (No debug output)The auto backup mode" is not working.	
HYB-191	[WDSC] User agreement for package download/package install is not persistent after FOTA: HL7802:E0.5.3.4.0 <->HL7802:E0.5.3.4.0.99	User agreement for package download/package install is not persistent after FOTA. <i>Note:</i> <ul style="list-style-type: none">The issue happens when user updates FW by SFT tool (HL7802:E0.5.3.3.0 -> HL7802.5.3.4.0)SFT from 4.3.6.0 -> 5.3.0.0: issue does not happenSFT from 4.3.6.0 -> 5.3.4.0: issue happens	AVMS

6.2 Known Issues

The following issues may be observed in the Release 3.0.

ID	Title	Description	Impacted Domain
ALT1250-4721, ALT1250-4726	Design change for CMUX URC Behavior	<ul style="list-style-type: none"> The URC configuration on the MUX channels is applied globally. Change CMUX RTS signal always be hardware flow control. 	CMUX
HYB-261, HYB-127, HYB-603	Improvement of NVBU/Auto restore algorithm	<ul style="list-style-type: none"> Module does not auto restore when the reboot counters reach the limit. Module takes 5 minutes to recover the configs. When NVBU automatic mode is enabled, the module switch to other carriers will cause recovery back to the original carriers. 	NVBU
HYB-573, ALT1250-4744, ALT1250-4720, ALT1250-4615, ALT1250-4561, ALT1250-4265	Incorrect Ring Indicator behavior on CGREG and CREG State change	<ul style="list-style-type: none"> No RI Pulse on CGREG state change. CGREG and CREG always share the same status. The RI duration setting is not correct, and it makes the RI not pulse. The RI pulse duration is not configurable for PPP. RI for PPP did not handle sending the data package. AT+CREG/+CREG/+CGREG URC enabling/disabling setting is not retained during the power cycle. 	Ring Indicator
ALT1250-4907, ALT1250-4585, ALT1250-4573	Module crash on operation of TCP/UDP	<ul style="list-style-type: none"> The module crashes when sending different combinations of dashes, plus and text to UDP server. Module can't delete a TCP session when starting TLS over TCP server with server authenticate. Module crashes when starting TLS over TCP server using server authentication. 	TCP/UDP
ALT1250-4613, ALT1250-4772	+KSRAT=2 not working properly	<ul style="list-style-type: none"> Module stuck after attaching network in T-Mobile. Module enters into a loop of resets. 	Network
HYB-606	PINGCMD causing a crash when issued from CLI/DEBUG port	The module will crash when using +PINGCMD command to ping host in CLI port.	Debug tool
ALT1250-4594	[HL7812] Module replies with incorrect EDM notifications	Issue found during Bootstrap testing, module responses are incorrect EDM notifications.	R2C

ID	Title	Description	Impacted Domain
ALT1250-4682	[AVMS][WDSS] Module crashes when sending AT+WDSS=1,0 before the URC +WDSI: 23,1	Module crashes when trying to connect to Octave company server.	AVMS
ALT1250-4459	[LPM] Module cannot go to hibernation with APN configured	Configure APN for PDP context 1 and reset module. Make sure the module is attached to the network, then configure eDRX or PSM. Configure module by going to hibernate mode using command AT+KSLEEP=1, then module cannot go into hibernation.	Low Power Mode
ALT1250-4609	[PSM] Module crashes when entering into hibernate mode with embedding SIM after some period T3412		Low Power Mode
HYB-578	High current consumption with DRX=320ms		Low Power Mode

>> 7: Restrictions

This section presents additional information or restrictions that should be considered for Release 3.x.

Feature	Description (What/When)	Impacted Functionality/Sub-Functionality
RF TX/RX test	RF test commands +WMTXPOWER/+WMRXPOWER are not supported on NB1.	RX/TX Power (NB1)
Band restrictions	Band 17 is not supported on Cat-M1. Do not enable it.	Cat-M1 Bands

>> A: Appendix

A.1 Abbreviations and Definitions

Abbreviation/Acronym	Definitions
ATIP	IP services for direct communication over AT command interface, including AT+KTCP, AT+KUDP, AT+KHTTP, AT+KFTP
AVMS	Air Vantage Management Services
DTR	Data Terminal Ready
IMEI	International Mobile Equipment Identity
PPP	Point-to-Point Protocol
RRC	Radio Resource Control
SIM	Subscriber Identity Module
SINR	Signal to Interference plus Noise Ratio
UART	Universal Asynchronous Receiver Transmitter
URC	Unsolicited Result Code
USB	Universal Serial Bus

A.2 Related Documentation

Ref. #	Doc. #	Document title
[R-1]	41111821	AirPrime HL78xx AT Commands Interface Guide
[R-2]	41114133	HL781x - Product Technical Specification.pdf
[R-3]	41112256	AirPrime HL78xx Development Kit User Guide
[R-4]	2174229	AirPrime HL7800 Low Power Modes Application Note
[R-5]	2174213	AirPrime HL78xx Customization Guide Application Note
[R-6]	2174259	HL781x - FW Update Methods Application Note